

# Ongoing Review and Update of Circular DEQ-12B: Nutrient Standards Variances

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Nutrient Work Group Meeting #4

Helena, MT

March 27, 2017



**DEPARTMENT CIRCULAR  
DEQ-12A**

**Montana Base Numeric Nutrient Standards**



**DEPARTMENT CIRCULAR  
DEQ-12B**

**Nutrient Standards Variances**

<http://deq.mt.gov/Water/WQPB/Standards>

# Where HAC will be updated in Circular DEQ-12B...

**Table 12B-1. General variance end-of-pipe treatment requirements.**

Discharger Category <sup>1</sup>	Monthly Average	
	Total P (µg/L)	Total N (µg/L)
≥ 1.0 million gallons per day	1,000	10,000
< 1.0 million gallons per day	2,000	15,000
Lagoons not designed to actively remove nutrients	Maintain current performance	Maintain current performance

<sup>1</sup> See Endnote 1

Endnote 1 says the categories are to be based on design flow.

# Identifying HAC

## ≥1MGD:

- ✓ Identify range based primarily on group costs
- ✓ Consider NWG comments
- ✓ Review other BNR facilities with dual nutrient control discharging in the identified range

## <1MGD:

- ✓ Identify range based primarily on group costs
  - ✓ No treatment level reviewed was affordable
- ✓ Consider NWG comments, especially future collection system costs
- ✓ Engineers' judgements as to what advanced operational strategies can achieve for these facilities

# HAC Ranges, Based on Work Reviewed by the Subcommittee

- ≥1MGD: In the range of 4 to 7 mg TN/L, and >0.1 to 0.4 mg TP/L.
- <1MGD: 7 mg TN/L and 0.5 mg TP/L were not affordable for most POTWs in this group. HAC in the range of >>7 to 10 mg TN/L, and 1.0 mg TP/L.

# Current and Proposed Treatment Requirements in DEQ-12B

## ≥1MGD Category:

- Current: 10 mg TN/L and 1.0 mg TP/L
- Proposed: 6 mg TN/L and 0.3 mg TP/L

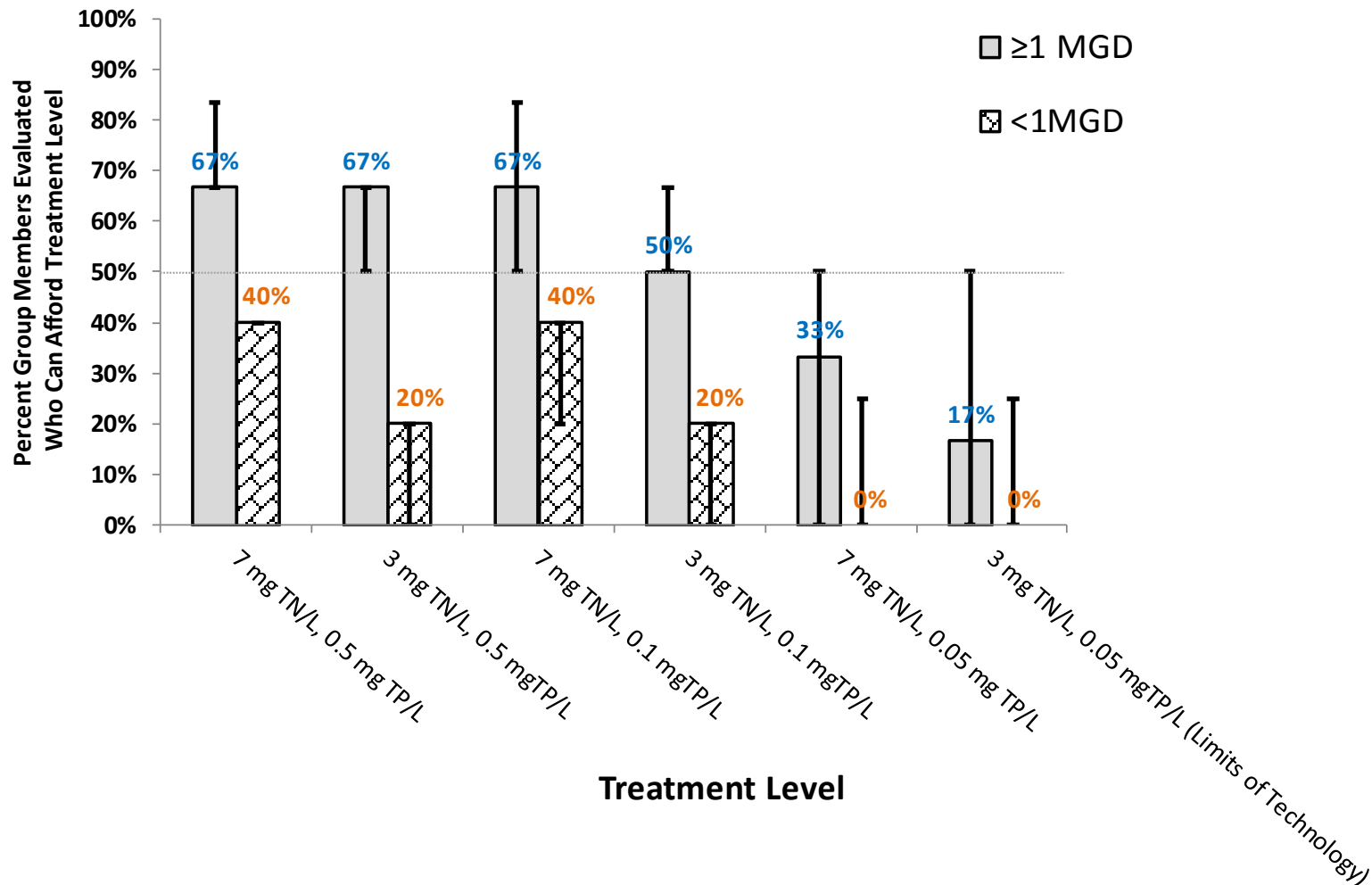
## <1MGD Category:

- Current: 15 mg TN/L and 2.0 mg TP/L
- Proposed: 10 mg TN/L and 1.0 mg TP/L

## Lagoons:

- No major changes
  - Department and permittees implementing Pollutant Minimization Program

# ≥1MGD, <1MGD Mechanical Categories



Percent of Members in a Discharger Group (≥ 1MGD, <1MGD) Who Can Affordably Meet (Per DEQ Methods) a Specified Wastewater Treatment Level. Only POTW group members are shown, and, among them, only those that will probably need a variance. Error bars are the % of members who can afford a treatment level, based on a range of cost estimates for the facility upgrades (per class 5 engineering planning estimates).

**≥1MGD:**  
**Tan =**  
**Dual-**  
**Nutrient**  
**Control**  
**Facilities**  
**in the**  
**Cost**  
**Range**

*No permit  
exceedences  
expected  
per cycle*

*Some permit  
exceedences  
possible per  
cycle*

**95<sup>th</sup> percentile performance of a non-random sample of facilities with advanced nutrient removal.**

	Design				TP: where in		
	Flow (MGD)	Facility	TN (mg/L)	TN: where in 4-7 range?	Facility	TP (mg/L)	>0.1 to 0.4 range?
<b>Dual Nutrient Control Facilities</b>	5.5	Butte (MT)	3.2	Outside	Butte (MT)	<i>too soon</i>	n/a
	8.5	Bozeman (MT)	8.1	Outside	Bozeman (MT)	0.58	Outside
	2.4	Palmetto (FLA)	3.6	Outside	Palmetto (FLA)	0.56	Outside
	6.0	Annapolis (MD)	6.8	Mid	Annapolis (MD)	0.25	Mid
	3.3	Bowie (MD)	4.6	Mid	Bowie (MD)	<i>no data</i>	n/a
	15.0	Largo (FLA)	3.5	Outside	Largo (FLA)	0.60	Outside
	8.0	Frederick (MD)	9.1	Outside	Frederick (MD)	1.07	Outside
	5.0	Westminster (MD)	5.7	Mid	Westminster (MD)	0.40	Within
	8.1	Cambridge (MD)	3.9	Outside (just)	Cambridge (MD)	<i>no data</i>	n/a
	15.0	Cumberland (MD)	3.8	Outside (just)	Cumberland (MD)	0.30	Mid
<b>Average:</b>			<b>5.0</b>		<b>Average:</b>	<b>0.32</b>	

				<b>Average Effluent Conc. (mg/L)*</b>		<b>Estimated Effluent Coefficient of Variation (cv)*</b>	
<b>Treatment Plant (State)</b>	<b>Process Description<sup>†</sup></b>	<b>Design Flow (MGD)</b>	<b>Current % of Design Flow</b>	<b>TN</b>	<b>TP</b>	<b>TN</b>	<b>TP</b>
Butte (MT)	Membrane Bioreactor (MBR)	5.5	66%	2.7	1.98	0.14	0.2
Bozeman (MT)	5-stage Bardenpho (biological N removal and EBPR)	8.5	73%	5.0	0.22	0.47	0.81
Palmetto (FLA)	4-stage Bardenpho	2.4	58%	2.45	0.23	0.25	0.81
Annapolis (MD)	Enhance Nutrient Reduction	6.0	78%	2.83	0.15	0.91	0.49
Bowie (MD)	Oxidation Ditch	3.3	54%	3.09	<i>no data</i>	0.30	<i>no data</i>
Largo (FLA)	A <sup>2</sup> /O	15.0	43%	2.80	0.21	0.17	0.64
Frederick (MD)	A <sup>2</sup> /O	8.0	78%	7.35	0.70	0.17	0.31
Westminster (MD)	MLE-A <sup>2</sup> /O	5.0	100.0%	4.56	0.20	0.14	0.55
Cambridge (MD)	MLE	8.1	31.5%	2.35	<i>no data</i>	0.35	<i>no data</i>
Cumberland (MD)	Step Feed	15.0	62.9%	2.52	0.16	0.31	0.41
<b>Average:</b>				<b>5.6</b>	<b>0.37</b>	<b>0.3</b>	<b>0.6</b>

<sup>†</sup> Mainly from EPA, 2007. *Biological Nutrient Removal Processes and Costs*. Office of Water, Washington, D.C. EPA-823-R-07-002.

\*Descriptive statistics based on DMR data (year-round) available on EPA's ECHO site, which were expressed as monthly averages over the past several years.



# HAC for the <1MGD Category

# Future Collection System Costs

(data provided by Great West Engineering)

## Montana Communities Water and Sewer Replacement Estimates

Category	Population Range	Average LF Sewer (note 1)	Average Sewer Collection System Cost (note 1&6)	Average Annual Cost per User @ 75 year (note 1&2)	% of MHI @ 75 yr (note 1,2 &4)	Average Annual Cost Per User @ 100 year (note 1&3)	% of MHI @ 100 yr (note 1, 3 &4)
1	0-300	10,000	\$1,600,000	\$337	1.56	\$254	1.17
2	300-500	20,000	\$3,200,000	\$251	0.79	\$189	0.60
3	500-1000	23,000	\$3,400,000	\$178	0.56	\$134	0.42
4	1000-2000	40,000	\$6,300,000	\$166	0.48	\$125	0.36
5	2000-3000 (note 5)						
6	3000-4000	75,000	\$12,000,000	\$125	0.31	\$94	0.23
7	4000-5000	92,000	\$16,000,000	\$118	0.29	\$89	0.23
8	5000-6000 (note 7)	92,000	\$16,000,000	\$59	0.12	\$44	0.10
9	6000-7000 (note 7)	158,000	\$27,000,000	\$144	0.35	\$108	0.26
10	7000-8000 (note 5)						
11	9000-10000 (note 7)	314,000	\$55,000,000	\$217	0.50	\$164	0.37

1. Average of communities included in evaluation
2. Based on 75 year service life
3. Based on 100 year service life
4. MHI = Median Household Income
5. No data yet, but working on it.
6. Includes construction costs only not O&M
7. Only one community - need more

Conclusion: For <1MGD group, supports selecting HAC towards upper end of range

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# Updates to Guidance Document

- No change to Limits of Technology definition
  - 4 mg TN/L & 0.07 mg TP/L (reasonable, for “consistently achievable”)
- Deleting Section 2.0 nutrient reduction steps (aka glide path)
  - Replacing with description of process for identifying HAC, lessons learned
- Supplementing Section 3.0 with additional guidance on individual variances

# 2017 Nutrient Standards Variances Triennial Review: Release of Documents

- **April 3<sup>rd</sup>**: Proposed rule amendments (MAR notice includes: hearing date, public comment period extent, rule amendments, and a statement of reasonable necessity (SRN)).
  - Proposed rule changes are the date of Circular DEQ-12B in ARM 17.30.660.
  - SRN discusses key changes to Circular DEQ-12B, and why
- **April 14<sup>th</sup>**: MAR notice published. Inform interested parties, send out press release. Materials for public should be ready:
  - (1) Track-changes Circular DEQ-12B; (2) track-changes Guidance Document, (3) Technical Report on triennial review; and possibly (3) YouTube video summarizing key aspects of triennial review will appear shortly after
  - Materials will be available via links to DEQ's webpage, unless hard-copies were specifically requested
- **May 31<sup>st</sup>**: Public hearing, after 45 days. DEQ, Room 111, 9am-12, Helena.
- **June 23<sup>rd</sup>**: MAR publication date for the adopted rules.
- **July 1<sup>st</sup>, 2017**: Variances in Circular DEQ-12B expire.

Thank you Nutrient Work Group  
for all of your valuable input